AMENDMENTS TO THE CLAIMS

1. (Currently amended) A transmitting system comprising:

a processor to process at least one collimated input beam which has been modulated with a data signal to produce multiple time-delayed output ~~beams~~ taps, the multiple time-delayed output ~~beams~~ taps being spatially distributed and independently phase shifted;

an integration lens to receive the phase modulated output ~~beams~~ taps and to reintegrate the phase modulated output ~~beams~~ taps into a single encoded beam with a time series chip sequence; and

an optical fiber to receive the integrated encoded beam from the integration lens and to transmit the integrated encoded beam.

2. (Currently amended) A receiving system comprising:

a processor to process the encoded collimated light beams received from a transmitter to produce multiple time-delayed output ~~beams~~ taps, the multiple time-delayed output ~~beams~~ taps being spatially distributed and independently phase shifted;

an integration lens to receive the phase-shifted output ~~beams~~ taps and to reintegrate the phase-shifted output ~~beams~~ taps into a single decoded beam; and

a photo detector to receive the integrated decoded beam and to generate an output.

3. (Currently amended) A transmitting system comprising:

an optical tapped delay line device to process at least one collimated input beam which has been modulated with a data signal to produce multiple time-delayed output ~~beams~~ taps, the optical tapped delay line device having a cavity with front and back surfaces, wherein one of the front and back surfaces of the cavity phase adjusts the phase of the input beam travelling within the cavity;

an integration lens to receive the phase modulated output ~~beams~~ taps and to reintegrate the phase modulated output ~~beams~~ taps into a single encoded beam with a time series chip sequence; and

an optical fiber to receive the integrated encoded beam from the integration lens and to transmit the integrated encoded beam.

4. (Currently amended) The system of claim 3, wherein the optical tapped delay device includes an etched plate having an etch depth sufficient to produce a desired phase shift through the time delayed output ~~beams~~ taps.

5. (Currently amended) A transmitting system comprising:

an optical tapped delay line device to process at least one collimated input beam which has been modulated with a data signal to produce multiple time-delayed output ~~beams~~ taps;

a phase modulator to independently phase modulate each of the output ~~beams~~ taps;

an integration lens to receive the phase modulated output ~~beams~~ taps and to reintegrate the phase modulated output ~~beams~~ taps into a single encoded beam with a time series chip sequence; and

an optical fiber to receive the integrated encoded beam from the integration lens and to transmit the integrated encoded beam.

6. (Currently amended) A receiving system comprising:

an optical tapped delay line device to process encoded collimated light beams received from a transmitter to produce multiple time-delayed output ~~beams~~ taps;

a phase modulator to independently phase modulate each of the output ~~beams~~ taps;

an integration lens to receive the phase modulated output ~~beams~~ taps and to reintegrate the phase modulated output ~~beams~~ taps into a single decoded beam; and

a photo detector to receive the integrated decoded beam and to generate an output.

7. (Currently amended) A receiving system comprising:

an optical tapped delay line device, to process encoded collimated light beams received from a transmitter to produce multiple time-delayed output ~~beams~~ taps which are independently phase shifted, the optical tapped delay line device having a cavity with front and back surfaces, wherein one of the front and back surfaces of the cavity phase adjusts the phase of the input beam travelling within the cavity;

an integration lens to receive the phase shifted output ~~beams~~ taps and to reintegrate the phase shifted output ~~beams~~ taps into a single decoded beam; and

a photo detector to receive the integrated decoded beam and to generate an output.

8. (Currently amended) The system of claim 7, wherein the multiple time-delayed output ~~beams~~ taps are mutually phase-shifted by an etched pattern on one of the front and back surface of the cavity as a function of the at least one frequency of the input beam which is an inverse reverse accumulated order of a corresponding pattern etched on the transmitter.

9. (Currently amended) A transmitting method comprising:

processing at least one collimated input beam which has been modulated with a data signal to produce multiple time-delayed output ~~beams~~ taps, the multiple time-delayed output ~~beams~~ taps being spatially distributed and independently phase shifted;

independently phase modulating each of the output ~~beams~~ taps;

receiving the phase modulated output ~~beams~~ taps at an integration lens;

reintegrating the phase modulated output ~~beams~~ taps into a single encoded beam with a time series chip sequence;

receiving, via an optical fiber, the integrated encoded beam from the integration lens; and

transmitting the integrated encoded beam.

10. (Currently amended) A receiving method comprising:

processing encoded collimated light beams received from a transmitter to produce multiple time-delayed output ~~beams~~ taps, the multiple time-delayed output ~~beams~~ taps being spatially distributed and independently phase shifted;

receiving, at an integration lens, the phase shifted output ~~beams~~ taps;

reintegrating the phase shifted output ~~beams~~ taps into a single decoded beam;

receiving the integrated decoded beam at a photo detector; and

generating an output from the integrated decoded beam.

11. (Currently amended) A transmitting method comprising:

processing, with an optical tapped delay line device, at least one collimated input beam which has been modulated with a data signal to produce multiple time-delayed output ~~beams~~ taps, the optical tapped delay line device having a cavity with front and back surfaces, wherein one of the front and back surfaces of the cavity phase adjusts the phase of the input beam travelling within the cavity;

receiving, at an integration lens, the phase modulated output ~~beams~~ taps;

reintegrating the phase modulated output ~~beams~~ taps into a single encoded beam with a time series chip sequence;

receiving, at an optical fiber, the integrated encoded beam from the integration lens; and

transmitting the integrated encoded beam.

12. (Currently amended) A receiving method comprising:

processing encoded collimated light beams received from a transmitter to produce multiple time-delayed output ~~beams~~ taps, the multiple time-delayed output ~~beams~~ taps being spatially distributed;

independently phase modulating each of the output ~~beams~~ taps;

receiving, at an integration lens, the phase shifted output ~~beams~~ taps;

reintegrating the phase shifted output ~~beams~~ taps into a single decoded beam;

receiving the integrated decoded beam at a photo detector; and

generating an output from the integrated decoded beam.

13. (Currently amended) A transmitting method comprising:

processing, with an optical tapped delay line device, at least one collimated input beam which has been modulated with a data signal to produce multiple time-delayed output ~~beams~~ taps;

independently phase modulating each of the output ~~beams~~ taps;

receiving, at an integration lens, the phase modulated output ~~beams~~ taps;

reintegrating the phase modulated output ~~beams~~ taps into a single encoded beam with a time series chip sequence;

receiving, at an optical fiber, the integrated encoded beam from the integration lens; and transmitting the integrated encoded beam.

14. (Currently amended) A receiving method comprising:

processing, with an optical tapped delay line device, encoded collimated light beams received from a transmitter to produce multiple time-delayed output ~~beams~~ taps which are independently phase shifted, the optical tapped delay line device having a cavity with front and back surfaces, wherein one of the front and back surfaces of the cavity phase adjusts the phase of the input beam travelling within the cavity;

receiving, at an integration lens, the phase shifted output ~~beams~~ taps;

reintegrating the phase shifted output ~~beams~~ taps into a single decoded beam;

receiving the integrated decoded beam at a photo detector; and

generating an output from the integrated decoded beam.

15. (Original) The system of claim 1, wherein the modulation can be implemented in a spectral domain.

16. (Original) The system of claim 2, wherein the modulation can be implemented in a spectral domain.

17. (Original) The system of claim 3, wherein the modulation can be implemented in a spectral domain.

18. (Original) The system of claim 5, wherein the modulation can be implemented in a spectral domain.

19. (Original) The system of claim 6, wherein the modulation can be implemented in a spectral domain.

20. (Original) The system of claim 7, wherein the modulation can be implemented in a spectral domain.

21. (Previously presented) The system of claim 1, wherein the system can be used as an optical equalizer.

22. (Previously presented) The system of claim 2, wherein the system can be used as an optical equalizer.

23. (Previously presented) The system of claim 3, wherein the system can be used as an optical equalizer.

24. (Previously presented) The system of claim 5, wherein the system can be used as an optical equalizer.

25. (Previously presented) The system of claim 6, wherein the system can be used as an optical equalizer.

26. (Previously presented) The system of claim 7, wherein the system can be used as an optical equalizer.

27. (Original) The system of claim 1, wherein the system can be used in wide-band signal generation.

28. (Original) The system of claim 2, wherein the system can be used in wide-band signal generation.

29. (Original) The system of claim 3, wherein the system can be used in wide-band signal generation.

30. (Original) The system of claim 5, wherein the system can be used in wide-band signal generation.

31. (Original) The system of claim 6, wherein the system can be used in wide-band signal generation.

32. (Original) The system of claim 7, wherein the system can be used in wide-band signal generation.

33. (Currently amended) A receiving system comprising:

an optical tapped delay line device having a cavity to process at least one collimated input beam to produce multiple time delayed spatially distributed output ~~beams~~ <u>taps</u> in a linear array;

a second input beam which projects at an angle to a plane of the optical tapped delay line linear array to interfere with each optical tapped delay line beam;

a two-dimensional photo detector array arranged to sample the interfering beams; and

an electronic amplifier to sample the two-dimensional photo detector array.

34. (Original) The system of claim 33, wherein the optical tapped delay line input beam is modulated with a data signal and the second input beam is a coherent reference.

35. (Original) The system of claim 33, wherein the optical tapped delay line input beam is a coherent reference and the second input beam is modulated with a data signal.

36. (Currently amended) A receiving system comprising:

an optical tapped delay line device having a cavity to process at least one collimated input beam to produce multiple time delayed spatially distributed output ~~beams~~ <u>taps</u> in a linear array;

a second optical tapped delay line device having a cavity to process at least one collimated input beam to produce multiple time delayed spatially distributed output ~~beams~~ <u>taps</u> in a linear

array, wherein each optical tapped delay line beam interferes with the corresponding beam of the first optical tapped delay line;

a two-dimensional photo detector array arranged to sample the interfering beams; and

an electronic amplifier to sample the two-dimensional photo detector array.

37. (Currently amended) The system of claim 36, wherein output ~~beam~~ tap to output ~~beam~~ tap delays propagate in a same direction in the optical tapped delay line device and the second optical tapped delay line device and an output of the receiving system is a correlation of the signals on the input beams.

38. (Currently amended) The system of claim 36, wherein output ~~beam~~ tap to output ~~beam~~ tap delays propagate in opposite directions in the optical tapped delay line device and the second optical tapped delay line device, and an output of the receiving system is a convolution of the signals on the input beams.